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Proceedings of the RAP Meeting on Hornaday River Arctic Charr

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Abstract

To determine the status of the Hornaday River Arctic charr stock a Regional Advisory Process meeting was held in Inuvik in 1999. A committee consisting of user groups and the Department of Fisheries and Oceans reviewed a draft stock status report. Stock delineation, migration and life history of the Hornaday charr stock were reviewed and updated. The fishery and the view of the fishers were discussed. Various aspects of the biology were discussed in the Resource Status section. Stock delineation, stock size and stock trend were reviewed. Sustainable harvest rate, outlook and management considerations were reviewed.

Résumé

Afin de déterminer l'importance des stocks d'omble chevalier de la rivière Hornaday, on a organisé une réunion du Processus consultatif régional à Inuvik, en 1999. Un comité constitué de groupes d'utilisateurs et de représentants du ministère des Pêches et des Océans a examiné un rapport préliminaire sur l'état des stocks, ce qui a permis d'étudier et d'actualiser les données sur les limites de territoire, la migration et l'évolution biologique des stocks d'omble chevalier de la rivière Hornaday. On a discuté des pêches et de l'opinion des pêcheurs. La partie sur l'état des ressources a également abordé divers aspects de la biologie de cette espèce. On a examiné les limites de territoire ainsi que la taille et la tendance de reproduction des stocks, le taux d'exploitation durable ainsi que les perspectives de la pêcherie et la gestion.

Introduction

The Chair of the meeting outlined the Regional Advisory Process (RAP). A draft Stock Status Report (SSR) and background documents were prepared by the Department of Fisheries and Oceans (DFO) and distributed for review by the Hornaday charr RAP committee prior to the meeting. The RAP committee was composed of an outside Arctic fisheries expert, and representatives of the Fisheries Joint Management Committee member, the Paulatuk Hunters and Trappers Committee, Parks Canada, DFO Fisheries Management and DFO Science Branches. The intent of the meeting was to discuss reviewers' comments and further discuss background material to revise the SSR. The SSR and proceedings of the RAP would then be sent to the committee for final review. Final changes would then be made to the SSR before it is submitted to the Central and Arctic Regional Director of Science (RDS) for approval. Once signed off by the RDS, the SSR would be sent to the Canadian Stock Assessment Secretariat (CSAS) in Ottawa and posted on its web site.

The agenda of the meeting is in Annex 1 and the list of participants in Annex 2.

Opening remarks were made to indicate the nature of the RAP process to the participants, in particular, the replacement of the Arctic Fisheries Stock Assessment Committee by regional assessment process committees.

Stock delineation, migration and life history.

The species description in the 'Background' section was discussed. The committee concluded that charr in the lakes of the Hornaday system such as Seven Island Lake and Rummy Lake should be described as 'non-anadromous' rather than 'landlocked'. The reference to McPhail (1961) was noted as being out of date and that those more recent revisionary references of Reist (1989) and (Reist 1997) should be added.

A question was raised whether the charr in the Hornaday were Dolly Varden charr, *Salvelinus malma*, rather than Arctic charr, Salvelinus alpinus. However, the committee concluded that the current literature placed Hornaday charr in the species *S. alpinus*.

A question was raised whether Arctic charr were found above La Ronciere Falls. According to traditional knowledge the charr do not occur above this point. Non-anadromous charr are found at Rummy Lake. In addition, it was observed from traditional knowledge that Akluk Creek was not passable to charr migrating upstream.

The general physical description was improved with a more precise description, replacing 'long slender bodies' with 'salmon or trout-like', and changing 'silver coloration' to 'a dark back and silvery colouration on the sides'.

Several format changes were proposed. It was suggested that the report could include a colour image of spawning charr from the Hornaday River. However, it was uncertain whether the format of the SSR could accommodate this addition. After some discussion it was decided that kilograms and centimeters were consistent with the standard for SSRs but that Imperial measurements would be kept in brackets with the initial use of metric units.

The Fishery

There was discussion regarding whether to include information of catch by number or by weight. The text refers to catch by number while the accompanying figure 2 refers to catch by weight. It was decided to

report on both measures with an accompanying figure for each because charr may be taken as a sport, subsistence (food), or commercial harvest. Sport fisheries are regulated by numbers while commercial catches are regulated by weight. Subsistence may be regulated (by the HTC) by either weight or numbers. As well, it was suggested that the text summary of catch trends be split into three time periods reflecting consistent catch levels rather than reporting by decades.

View of the Fishers

The committee was unanimous in its discomfort with the use of the term 'fishers' owing to the confusion with the common name for a fur bearing mammal of the north. Alternatives suggested were 'resource users' and 'harvesters'.

Resource Status

It was decided to move the first 2 paragraphs that discussed the life cycle of charr in the Hornaday system into a separate section entitled life history. The rationale was that the section was out of place in Resource Status but charr life cycle was important to understand in the management of charr. These paragraphs were placed before the Fishery section.

It was suggested that a general description of the unique life cycle of Arctic charr compared to other anadromous fishes be added to the text. Charr were noted for being iteroparous (living on after spawning to possibly spawn several times in their life), and making annual migrations to and from the sea. It was noted that they are more correctly classified as an amphidromous animal but it was felt that the anadromous designation would still be used because it included them into a larger more generally recognized class for management purposes.

There was lengthy discussion on the likely rearing areas for charr within the system. It was concluded that there probably was rearing in the small tributary streams and lakes of the main river as well as along the shallows of the river channel.

There was a discussion of the physical condition requirements for spawning in Arctic charr. Supportive references from Dutil (1985, 1986) demonstrating the relationship between spawning and annual condition for charr could be included in the text. It was concluded that spawning every 2 years per individual was a reasonable approximation for this stock but that spawning might occur more or less frequently depending upon the environmental conditions of that year. References to Johnson (1980) and Babaluk's unpublished results from strontium analysis should be included in the SSR.

A presentation was made on the use of strontium analysis of otoliths to determine the age at first sea migration, the degree of anadromy and stock structure of Hornaday River charr. In the Hornaday River, charr go to sea as early as age 2 with most entering the sea for the first time at age 3. It was noted that while this was earlier than expected there were cases on the Labrador coast where charr went to sea in their first year.

Examples from the strontium analysis were presented to confirm that the Hornaday system contains charr that remain in fresh water all their lives as well as those that go to sea. A discussion of the typical pattern of resident (non-anadromous), landlocked and anadromous charr in Canadian Arctic stocks ensued. It was concluded that most anadromous stocks of charr also had resident populations associated with them. Observations from the Nauyuk Lake study indicated that these two forms might be spawning in the same area although not necessarily with complete overlap. Genetic mixing under these conditions was likely. In the Hornaday system, the anadromous charr are unlikely to interact directly with the resident population because physical barriers in the system prevent sea run fish from migrating to the upper lakes in the drainage. However, residents may move downstream during periods of high flow and

subsequently mingle with the anadromous population. In general, it was thought that each system is unique and that no single model of the relationship between anadromous and resident could be applied over all systems.

There was also an indication from strontium analysis of the otolith primordium that two and perhaps three places of origin of anadromous charr were present in the system.

The results were noted to be preliminary based on 20 fish sampled. More research will be required to sort out the possibilities.

Stock Delineation

A question was raised regarding why Pearce Point was important. In response it was noted that this area might be a potential fishing area for the community.

Lengthy discussion ensued regarding the tag returns in the Hornaday system. Two types of experiments had been undertaken. The first was with the application of a large number of floy tags to charr in the Hornaday. Of these none had been subsequently re-captured outside the Hornaday system. The second experiment was part of a radio-telemetry program on charr. Between radio sightings and re-captures by fishermen none of these (20) fish moved to another system. It was suggested that the sample size of marked and re-captured fish be recorded for each study in the SSR.

There was also a lengthy discussion regarding whether the preliminary strontium analysis indicated the presence of three distinct stocks within the system. The committee concluded that the present data indicated that there were at least 2 "places of origin" but that the word stock should not be applied, yet.

Stock Size

The estimate of 16,000 charr was questioned on a number of grounds. First, it was observed that this estimate was based upon a weir operation 13 years ago and therefore may not be relevant to the present-day state of the stock. Secondly, it was apparent that there was no formal methodology applied to attaining this number. The consultant's report indicated that the weir had washed out during the study and gave a rationale for why there should be more charr than counted since part of the run would presumably arrive after the destruction of the weir. However, the increase in the estimate by 30% represented a guess with no formal statistical basis. It was decided that this estimate could be improved through a formal procedure assuming that the pattern of temporal abundance could be fitted to one or two normal curves and the remaining numbers in the run could be estimated from the missing area under the curve.

An observation from traditional knowledge was that there were normally two runs on the Hornaday. It was stated that the later run had fish with smaller heads and bigger bodies than the earlier run.

Stock Trend

The minimum size at which charr could go to sea was discussed. The consensus was that this was around 20 cm. It was also noted that if charr in this system were unlikely to live longer than to age ten and matured at age 7 or 8 then most fish would only spawn once or twice per lifetime.

There was a discussion of catch per unit effort (CPUE). It was noted that charr often arrive in pulses and that if the effort was not distributed evenly there could be bias in CPUE estimates. In this case the effort appears to be sufficient and evenly distributed to prevent this type of bias. However, it was suggested

that the total number of days of effort be compared among years to determine if there could be some years where less effort might introduce uncertainty into CPUE estimates. It was also suggested that potential biases could be avoided by tracking the CPUE of individual fishermen.

It was noted that 1998 was an unusual year. The average temperature was much warmer, salmon were observed along the Beaufort Coast and in the Mackenzie River, and ice out was earlier than usual. In the Hornaday River the charr returned much earlier than usual and a much higher percentage of current year spawners were caught in the fishery.

The maximum age of charr has declined and was cause for concern. The reliance of the fishery on a limited number of age groups suggested to the committee that the stock was not at optimum level.

The lack of ages beyond age 10 in the catch was noted by the committee as an indication of heavy fishing and that there was risk of overfishing to the stock.

Mortality rates were noted to be high and were a cause for concern. It was noted that while mortality rates could change depending upon the choice of the first age at full recruitment that the rates were quite high regardless of the ages used in the analysis. The rates were well above what would be considered an optimum level for charr.

The committee noted that the constancy of weight of charr in the catch did not necessarily mean that there was stability in the stock. Observations from other stocks indicate that charr stocks may maintain the average weight as relatively constant right up to the time of fishery collapse. Therefore, the lack of change in average weight may be misleading.

Sustainable Harvest Rate

A point was made that 14% of the stock size was not a specific target used. Rather agreement was reached with the community that the community must reduce fishing to cut total harvest by 1/3 to 2300 kg. The 14% were calculated from the previous stock size estimate and the harvest number rather than the other way around. **It was agreed that a more scientifically based estimate of the total stock size would be calculated (see above for method) to replace the more ad hoc value used in the consultant's report.** Thus, this description will be revised for the final version. As well, **the committee recommended a re-organization of the section to emphasize that harvest would be cut to 1700 kg as agreed in the community fishing plan.** It was noted that the committee endorses the conservation level chosen by the community.

The committee noted that it is likely that the Hornaday River can sustain a level higher than the level recorded for the Nauyuk Lake stock. Members found it hard to imagine that the stock could have survived the levels of fishing mortality without a much higher rate of productivity. Regardless, it was still felt that the current levels of harvest had been above the sustainable level for the stock.

Outlook

There was general consensus that the stock was not healthy enough to be able to sustain historic catch levels. However, after much debate the committee decided to avoid using the word "depleted' to describe the state of the stock because it implied that there were no charr available for harvest. Cautionary words were required because many indicators such as age structure, mortality rates, and catch-per-unit-effort showed that the stock was below the optimum level. **The committee endorsed the conservation measures agreed to by the Paulatuk Hunters and Trappers Committee in the fishing plan.**

Other Considerations

The committee desired more information on the possible influences of natural predators, competitors and environmental variation. Critical habitats for spawning, rearing and over-wintering of Hornaday River charr should be described because changes to these habitats would have important consequences to stock productivity. The committee also suggested that the role relative to charr of other species such as whitefish, burbot, lake trout and Arctic grayling in the system be described.

Management Considerations

The various jurisdictions (Paulatuk HTC, Parks and DFO) and boundaries should be included and emphasis be placed upon the ongoing communication among important agencies. It was suggested that the Paulatuk charr management plan working group should include representation from Parks Canada. Possible conflicts with sports fishing regulations were examined. It was concluded that the current regulations are not at odds with conservation of the Hornaday charr stock. Presently, sport catches are minimal and not likely to become substantial in the near future.

A schedule for revision, final review and final revision and sign of was discussed. Due to commitments of the main author of the SSR revision would not be available until July 1, 1999. Review would be completed by August 1, 1999 and final revision by August 15, 1999 after which the SSR and proceedings would be ready for sign off.

Appendix 1. Agenda for RAP meeting on Hornaday River Arctic Charr, 3-4 June 1999, Eskimo Inn, Inuvik, NT.

June 3, 1999

09:00 - 09:30 Introductory remarks including an outline of the Regional Advisory Process

09:30-12:00 Discuss background information on stock delineation, migration, life history

13:00-15:00 Discuss the fishery and catch statistics

15:15-17:00 Discuss resource status, outlook and management considerations

June 4, 1999

08:30-12:00 Complete and finalize suggestions for changes in SSR, agree upon time frame for revision, final review and final revisions.

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